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## Assessing gender vulnerability within post-earthquake reconstruction: case study from Indonesia

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### Abstract

Understanding types of gender vulnerability and its determinants within disaster management context is useful to protect women and men from greater destabilization, to achieve better process of disaster management, to enhance sustainability of reconstruction and to build community resilience. Using mixed method combining qualitative and quantitative data analysis, this study reveals various dimensions of gender vulnerability within post-earthquake reconstruction at Yogyakarta province. This study found that the physical dimension (i.e. women with disabilities, pregnant women, elderly women), four types of social dimension (i.e. homeless women, violence against women, widow with many dependents, women heading household), and two types of economic dimension (i.e. women with debt burden and women with lack of productive assets) are the most prominent dimension. Existing patriarchal culture and weak of gendered institution are the root causes of gender vulnerability. This study suggests assessing gender vulnerability within post-disaster reconstruction helps key stakeholders to identify dimensions and determinants of gender vulnerability that should be tackled to ensure gender equality within post-disaster reconstruction.

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**Keywords:** gender, vulnerability, post-earthquake reconstruction, Indonesia

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## 1. Introduction

Understanding types of vulnerability and its determinants within disaster management context is useful to protect women and men from greater destabilization, to achieve better process of disaster management and to enhance sustainability of reconstruction and community resilience (Enarson, 2012; Ariyabandhu, 2009). This paper assesses gender vulnerability and its determinants within post-earthquake reconstruction in Indonesia. It contributes to gender and disaster literature as well as practice of disaster management in three ways. Firstly, it proposes a comprehensive gender vulnerability analysis comprises social, economic, political and cultural dimension to understand type of gender vulnerability that revealed within post-earthquake reconstruction. Secondly, it applies progress toward gendered vulnerability model to understand root causes, dynamic pressure and unsafe conditions leads to gendered vulnerability in post-earthquake reconstruction. Thirdly, mixed method combining qualitative and quantitative data analysis was applied to get insight understanding of gender vulnerability and its determinants.

## 2. Gender and vulnerability: concept and definition

Gender refers to “*socially constructed roles and socially learned behaviour and expectations associated with females and males*” (Moser & Moser, 2005). Wisner *et al.* (2004) acknowledge that relations of gender and power intersecting at different institutional sites structure vulnerability. The Hyogo Framework 2005-2015 (United Nation, 2005) defines vulnerability as “*set of conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards*”. Enarson (2012) explain that the risks involved in disasters must be connected with the vulnerability created for many people through their normal existence; “*as a primary factor of social organisation, gender shapes the social worlds within which disaster occur*”. Feminist scholarship demonstrates that gender serves as a primary organising principle of all societies and is therefore an essential lens through which to view the experience of a disaster (Fordham, 2003). Thus, disaster risk is socially distributed in ways that reflect the social divisions that already exist in society. Disasters magnify both the strengths and the weaknesses in society so the way gender is constructed influences how women and men are affected by disaster. Hence, gender vulnerability is understood as “*the characteristics of a women and men and their situation influencing their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard*” (Enarson, 2012).

## 3. Determinants of gender vulnerability

Studies conclude that gender vulnerability in disaster contexts are linked with existing vulnerability in everyday living and this is seen most clearly through unequal access to resources arising from structural inequalities embedded within society. Following Blaikie’s Pressure and Release Model (PAR) (2004) the progress toward gender vulnerability in disaster contexts can be identified from root causes, dynamic pressures and existing unsafe conditions within community (Figure 1). The root causes of gender vulnerability in societies is women lack access and control to power, structures and resources as well as paternalistic ideologies that create male dominants in political and economic system (Moser & Moser, 2005; Enarson & Chakrabarti, 2009). A gender-sensitive analysis demonstrates that women in patriarchal societies are disadvantaged (socially, economically, politically) and women from lower social classes even more so. It would be surprising, therefore, to find that this condition of disadvantage was not in operation in disaster situations (Fordham, 2003). For example, disaster often reinforced existing male domination in resources and discrimination against women within patriarchal culture and its left inequality in access and control to power, structured and resources within disaster management process. Dynamic pressures refer to micro and macro conditions lead to gender vulnerability (Wisner *et al.*, 2004). It is process and activities that translate the effects of root causes into the vulnerability of unsafe condition. For example, weak capacity of gendered institution in poor countries often lead to lack of gender mainstreaming action which in turn create vulnerable society, which also results in gender vulnerability (Enarson & Chakrabarti, 2009). In many cases, macro forces such as rural migration and urbanisation, pressure of labour forces and deforestation are linked to unsafe economic and environmental conditions such as fragile local economy and physical environment (Fordham, 2003; Ariyabandhu, 2009). In such conditions, women who are socially and economically disadvantaged in everyday life

can be expected to be more vulnerable or more greatly affected by a disaster. Hence, a higher risks woman is those who have higher vulnerability living in hazardous areas

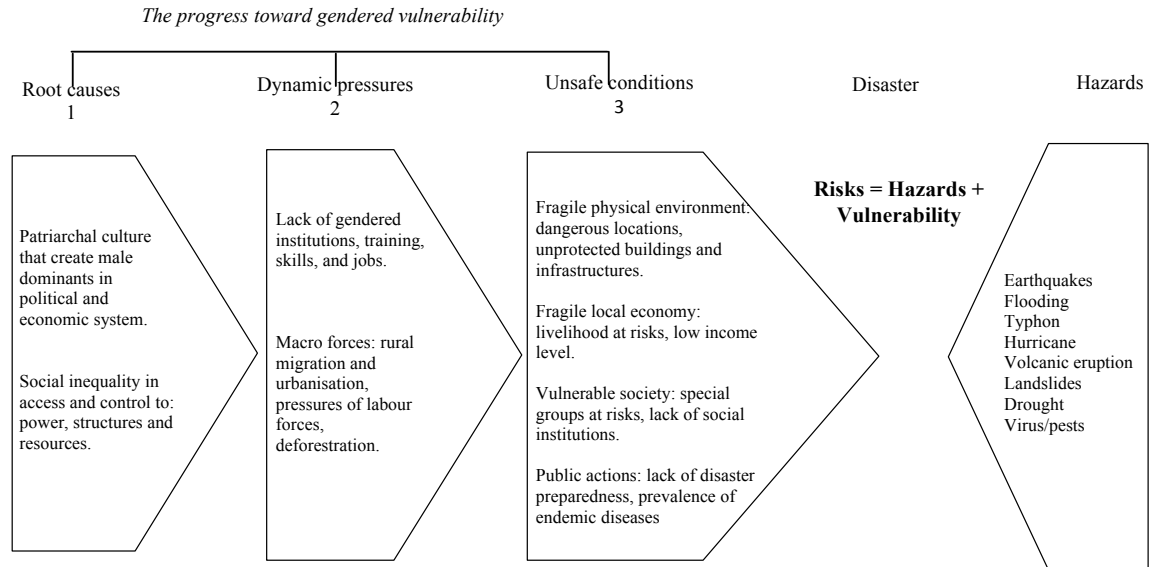


Figure 1 Progress toward gendered vulnerability (Source: author adapted from Blaikie *et al.*, 1994)

The root causes of gender vulnerability in societies is women lack access and control to power, structures and resources as well as paternalistic ideologies that create male dominants in political and economic system (Moser & Moser, 2005; Ariyabandhu, 2009; Enarson & Chakrabarti, 2009). A gender-sensitive analysis demonstrates that women in patriarchal societies are disadvantaged (socially, economically, politically) and women from lower social classes even more so. It would be surprising, therefore, to find that this condition of disadvantage was not in operation in disaster situations (Fordham, 2003). Dynamic pressures refer to micro and macro conditions lead to gender vulnerability (Wisner *et al.*, 2004). It is process and activities that translate the effects of root causes into the vulnerability of unsafe condition. For example, weak capacity of gendered institution in poor countries often lead to lack of gender mainstreaming action which in turn create vulnerable society, which also results in gender vulnerability (Enarson & Chakrabarti, 2009). In many cases, macro forces such as rural migration and urbanisation, pressure of labour forces and deforestation are linked to unsafe economic and environmental conditions such as fragile local economy and physical environment (Fordham, 2003; Ariyabandu, 2009). In such conditions, women who are socially and economically disadvantaged in everyday life can be expected to be more vulnerable or more greatly affected by a disaster.

#### 4. Measuring gender vulnerability

Gender vulnerability is a multidimensional concept. Prior studies have identified five main dimensions of gender vulnerability: physical, economic, social, political and cultural dimension (Fordham, 2003; Enarson, 2012; Ariyabandhu, 2009; Enarson & Chakrabarti, 2009). Physical dimension relates to the different of biological and physiological condition of women and men that increases their risks and affects their capacities to cope disaster situation. Enarson (2012) further explains this dimension includes pregnancy, physical disability, elderly, and malnourishment. Economic dimension relates to different access and control of economic resources between women and men that lead to their capacities to cope disaster. This dimension includes unequal access between women and men on job opportunities, markets, and productive assets. Social dimension refers to the inability of women and men to withstand adverse impacts from disaster due to characteristics inherent in social institutions and interactions. This

dimension includes unequal access between women and men on training and education as well as kinship groups. Political dimension of vulnerability means the unequal access and control between women and men relate to decision-making power structures. This dimension includes unequal access between women and men on leadership and decision making process. Cultural dimension refers to different between women and men determined by culture and religion that limits women capacity to cope disaster.

## 5. Mixed method

This study was conducted at Yogyakarta province. This province was severely damaged by the 2006 Central Java earthquake. This research focuses to identify gender vulnerability and its determinants within post-earthquake reconstruction. It is designed as an exploratory and intrinsic case study. Primary data was collected through in-depth interviews of policy makers and beneficiaries who dealt with and had knowledge of Yogyakarta earthquake reconstruction. Besides, the representatives of international and local NGOs whose programmes were related to the earthquake reconstruction were also interviewed. Beneficiaries' interviews were conducted separately between women and men in order to avoid male bias as well as to reveal women voices. In addition to in-depth interview, a set of questionnaire measuring gender vulnerability and its determinants was distributed to 110 reconstruction beneficiaries and 32 policy makers, implementers and community leaders both from government and from NGOs involve at disaster policy and management in the province. The questionnaire was administered in June 2013 and completed January 2014. Response rate of the questionnaires was 100%. Prior to the interview, informants and respondents were informed about why it is important for them to participate in the study. Confidentially and anonymity were ensured. Data was analysed using qualitative and quantitative methodology. Content analysis was used to explore types and proses toward gender vulnerability. Questionnaires were analysed using factor analysis and *t*-test in particular to identify prominent types and key determinants of gender vulnerability in post-earthquake reconstruction context.

## 6. Results

### 6.1. Types of gender vulnerabilities

Figure 2 shows type of gender vulnerabilities revealed resulted from beneficiaries' interview. All dimensions of gender vulnerability appear during Yogyakarta post-earthquake reconstruction. Among those dimensions, it reveals that social dimension of gender vulnerability is at the most, while political dimension of gender vulnerability is at the least. Type of social dimension of gender vulnerability appears include women heading household hold, women living alone, widow with many dependants, homeless women, women with lack of skills, women with lack access to education and training, women illiteracy, and violence against women. Across the affected areas, an increase number of female headship was reported, which doubled by some accounts. Increasing women living alone and homeless women increase risks of violence against them. Unemployed women, women low wages, women lack access to credit, women with domestic burden, women with debt burden, and women with lack productive assets are among economic dimension of vulnerability found. Anecdotal evidence suggests that women and men suffered losses of employment, but women were slower to return to paid work. For example, women in the handicraft and agro-processing industry have not yet to return to their jobs while their male counterparts have been employed in construction activities. Moreover, substantial loss of business space, equipment, supplies, and tools used in home-based business substantially increases women unemployment and poverty. Women unemployment rate and poverty increase sharply to 30% and 67% in 2007 (Yogyakarta Bureau of Statistic, 2010). Reconstruction has left women with weak physical ability vulnerable. Old, disabled and pregnant women suffer because lack access to public services particularly health care. Disrupted caregiving system is a major concern for women during reconstruction. Women care not only for small children, but also for elderly relatives, and other who are not able to work. In remote areas, sometimes women and girls eat last and least and be malnourished due lack of food stock. In some areas, women are also strongly culturally and religiously subordinated by men. In these areas, women face limit on their mobility to access services and to participate in reconstruction programmes. Political dimension of gender vulnerability includes women limited voices and participation, women lack access on decision-making and women lack of leadership. Interview with women raised concerns about the fact that the bulk of decision-making in relation

to resource allocation following disasters was being carried out by men. Further, there was concern that decisions made by men at the household and community level were not always fair, and most commonly did not involve women.

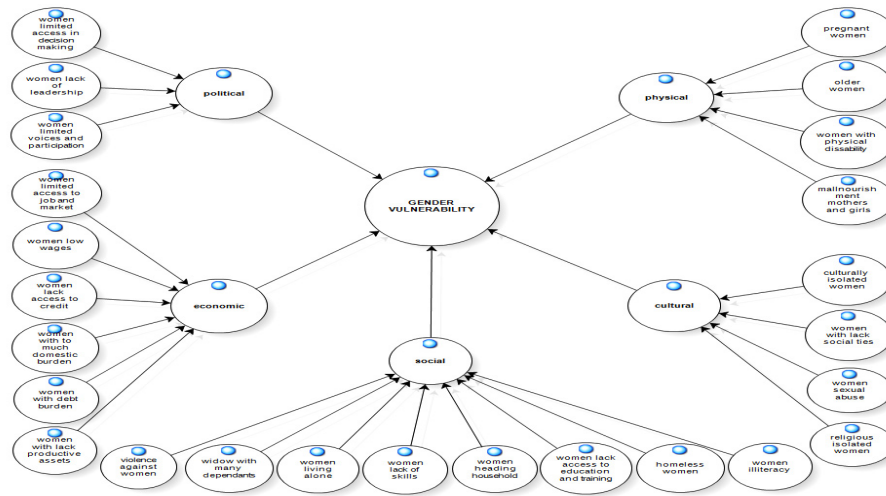


Figure 2: Cognitive map of gender vulnerabilities revealed in post-earthquake reconstruction

Table 1 shows results from descriptive, factor analysis and *t*-test shows the most prominent type of gender vulnerability within post-earthquake reconstruction. Results of a one sample *t*-test show all variables are significant at 5% indicate the significance level of each types of gender vulnerabilities. The proportion of most variables in particular for the most prominent types of gender vulnerabilities also quite large (between 80-90%) indicates those variables largely explain the overall variance. Three types of physical dimension (i.e. women with disabilities, pregnant women, elderly women), four types of social dimension (i.e. homeless women, violence against women, widow with many dependants, women heading household), and two types of economic dimension (i.e. women with debt burden and women with lack of productive assets) of gender vulnerability are the most prominent according to beneficiaries' survey. These types of gender vulnerability have the highest mean and proportion score.

Table 1: Types of gender vulnerability within post-earthquake reconstruction

	Mean	factor analysis		t-test		rank	rank total
		Proportion	variances	t	sd		
<i>Social dimension</i>							
Homeless women	4.801	0.870	0.630	58.562*	0.553	1	4
Violence against women	4.698	0.862	0.600	58.834*	0.552	2	6
Widow with many dependants	4.681	0.861	0.511	58.435*	0.571	3	8
Women heading household head	4.651	0.853	0.530	56.632*	0.543	4	9
<i>Economic dimension</i>							
Women with debt burden	4.790	0.871	0.662	53.762*	0.601	1	5
Women with lack of productive assets	4.641	0.814	0.611	55.432*	0.554	2	10
<i>Physical dimension</i>							
Women with disabilities	4.967	0.889	0.682	47.621*	0.671	1	1
Pregnant women	4.846	0.886	0.562	46.342*	0.567	2	2
Old women	4.834	0.872	0.551	38.762*	0.542	3	3
Malnourishment women and girls	3.934	0.752	0.541	38.762*	0.541	4	
<i>Cultural dimension</i>							
Women sexual abuse	4.690	0.864	0.662	53.752*	0.611	1	7
* p < 0.005							

\*  $p < 0.005$

## 6.2. Determinants of gender vulnerability

Gender vulnerability is deeply rooted in social and cultural practices and beliefs in society. Many different determinants contribute to women's vulnerability during Yogyakarta's earthquake reconstruction. Figure 3 shows determinants associated with gender vulnerability resulted from policy makers' and implementers' interview.

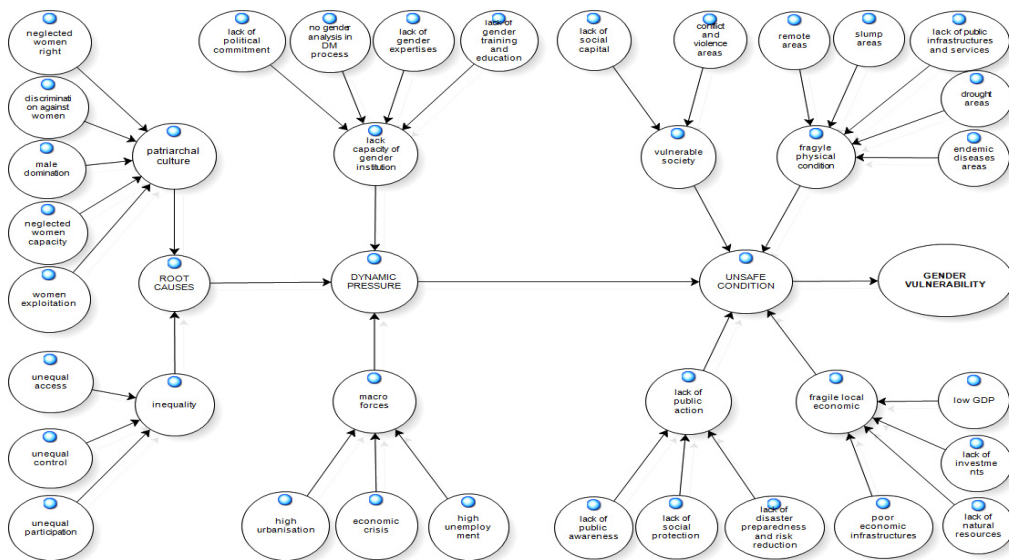


Figure 3: Determinants associated with gender vulnerability in post-earthquake reconstruction

Firstly, the root causes of vulnerability are patriarchal culture and equality exists within community. This patriarchal culture is manifested discrimination against women, male domination, neglected women right and capacity and exploitation against women. Women are mainly responsible for looking after children, preparing food for their family, collecting wood and fodder, and making dung cakes for fuel to cook food, and taking care of livestock. In addition, they are also involved in economic activities as agricultural labourers in neighbouring farms for four months in a year during rain season. Men, meanwhile, are engaged in wage-earning activities like casual labour, rickshaw pulling, and working in their own fields. Women's economic activities both inside and outside the home are less valued by the society than men's economic activities, and men are in most cases considered the breadwinner in the family, irrespective of their livelihood and level of wealth. Because of the discrimination that women face, and their heavy workload inside and outside the home, women have little opportunity to participate in communal activities and decision-making processes, and their needs and voices are often overlooked. These factors, along with illiteracy, and limited access to and control over resources, make women vulnerable during reconstruction. In addition, women's and men's different livelihood activities mean that women are more dependent on natural resources compared to men, and that their responsibilities increase during a disaster, as women are more concerned about their children and often remain in their house taking care of household belongings in times of crisis.

Secondly, various dynamic pressure exist within post-earthquake reconstruction create conditions that increase women vulnerability. Macroeconomic shocks such as global economic crisis directly affect women job and wellbeing in affected areas. For example, increasing handicraft-imported materials reduces women



job substantially since many homemade handicraft in industry cannot afford the imported materials. Global economic recession also increases food price inflation, which also affect women and girls physical well-being during reconstruction. Increasing urbanisation and job seekers limits women opportunities in particular those who lack of skills to get job in handicraft and agribusiness industries. During interview with policy makers, we also identify some pressures coming from lack capacity of gender institution in the local government. For example, there lack of political commitment in particular from local parliament and bureaucracy supporting gender mainstreaming programmes. Gender analysis, which is an important part for supporting a sensitive gender decision-making, was not implemented in some areas. Lack of gender expertise, who able to work closely with local government and affected communities are another factor that resulted in bias gender policy in some areas.

Thirdly, various unsafe conditions exist during reconstruction, which also lead to high gender vulnerability. Lack public awareness on disaster preparedness and disaster reduction increases risks. Limited social protection provided for women, elderly and children in particular to access food and health services increase malnourishment incidences among them. Collapsing local economy as indicated by declining local GDP, damaging local economic infrastructures, and reducing a substantially number of investments and resources following disaster places women in greater risks. Earthquake reconstruction was undergoing with fragile physical conditions in particular at remote areas where public facilities are very poor conditions. In some areas, endemic diseases such as diarrhoea occur in slump areas where clean water and sanitation were damaged severely. Losses of harvest and livestock have a disproportionate impact on women, many of whom rely on food processing, cattle, and chickens for their cash income. Fetching water becomes much more difficult, and it may be contaminated. Water-borne illness might be expected to be more widespread among women, who are nutritionally disadvantaged. These conditions are getting worst in conflict areas in which risks of violence against women were high.

Table 2: Results of descriptive, factor analysis and *t*-test of determinants associated with gender vulnerability

	mean		factor analysis			<i>t</i> -tests		rank	rank total
		<i>coef</i>	se	proportion	variances	<i>t</i>	sd		
<b>Root causes</b>									
<i>Patriarchal culture</i>									
Male domination	4.898	0.981*	0.005	0.971	0.601	49.834*	0.412	1	1
Neglected women right	4.881	0.842*	0.003	0.962	0.512	48.331*	0.370	2	2
Neglected women capacity	4.851	0.861*	0.002	0.921	0.430	46.631*	0.441	3	5
<i>Inequality</i>									
Unequal control	4.796	0.782*	0.006	0.752	0.521	50.320*	0.480	1	10
<b>Dynamic pressure</b>									
<i>Lack capacity of gender institution</i>									
Lack of political commitment	4.872	0.872*	0.008	0.910	0.691	42.670*	0.502	1	3
No gender analysis in DM	4.860	0.653*	0.010	0.914	0.612	55.431*	0.454	2	4
Lack of gender expertise	4.832	0.543*	0.011	0.878	0.522	46.361*	0.421	3	6
Lack of gender training and education	4.821	0.641*	0.006	0.711	0.691	46.601*	0.498	4	7
<i>Fragile physical condition</i>									
Poor public infrastructure and services areas	4.811	0.654*	0.003	0.812	0.662	47.761*	0.671	1	9
Remote areas	4.812	0.632*	0.002	0.801	0.701	53.521*	0.521	2	8
Note: gender vulnerability is aggregate of each type of gender vulnerability measures constructed using factor analysis. *** p < 0.005									

Note: gender vulnerability is aggregate of each type of gender vulnerability measures constructed using factor analysis. \*\*\*  $p < 0.005$

Table 2 shows results from descriptive, factor analysis and *t*-test shows the most prominent determinants associated with gender vulnerability within post-earthquake reconstruction. All determinants are statistically significant at 5% indicate the significant association between the determinants and gender vulnerability score. Most determinants within patriarchal culture and lack of gendered institution have highest mean and proportion score indicates the most prominent determinants on gender vulnerability. Results of a one sample *t*-test show all variables are significant at 5% indicate the significance level of each types of gender vulnerabilities. The proportion of most variables in particular for the most prominent determinants of gender vulnerabilities also quite large (between 80-90%) indicates those variables largely explain the overall variance.

## 7. Discussion and conclusion

Disaster are created by social conditions, and as a dominant social construct, gender plays a significant part in determining the scales of risk faced by sectors of a population (Fordham, 2003; Enarson, 2012). Enarson (2012) elaborates that far from unmediated natural events arising from human settlement in an inherently uncertain environment, natural disasters are social processes precipitated by environmental events and grounded in social relations and historical development patterns. The social construction of disasters results from power inequalities in society that leads to vulnerability of certain groups. Hence, women are made more vulnerable to disasters through their socially constructed roles. As Fordham (2003) writes that disasters magnify both the strengths and the weaknesses in society so the way gender is constructed influences how women are affected by disaster. The sexual division of labour, unequal access to resources and women's lesser participation in decision-making has significant repercussions on women's vulnerability within disaster contexts.

Gender issues are not manifestations of disaster-related crises, but are prevalent in society, operational and visible in daily life at the level of the individual, family, community and reflected institutionally as well as in social and cultural norms (Ariyabandhu, 2009). As this study shows that gender vulnerability within post-earthquake reconstruction in Yogyakarta province is deeply rooted in social and cultural practices and beliefs in society. The root causes of vulnerability are patriarchal culture and equality exists within community. This patriarchal culture is manifested by existing discrimination against women, male domination, neglected women right and capacity and exploitation against women during earthquake reconstruction.

Gender aspects within the social and community organisation lead to substantial differences in how women and men of all age groups experience and deal with disasters in the aftermath. Fothergill (1998) writes gender relations clearly play a role in the political economy of disaster, organisation relief and response, community leadership and mobilisation, household preparation and family recovery and disaster survival strategies. The current gender relations between women and men in disaster risk reduction have everything to do with the roles and responsibilities women and men have at home and in society. These roles result in different identities, social responsibilities, attitudes, and expectations. Such differences are largely unfavorable to women and lead to their vulnerabilities, and different capacities to reduce risk and respond to disasters. This study shows three types of physical dimension (i.e. women with disabilities, pregnant women, elderly women), four types of social dimension (i.e. homeless women, violence against women, widow with many dependents, women heading household), and two types of economic dimension (i.e. women with debt burden and women with lack of productive assets) of gender vulnerability are the most prominent dimension revealed. Hence, key stakeholders in post-disaster reconstruction should be aware of these types of gender vulnerabilities and ensure these are monitored during the reconstruction process.

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